

disappear. Again a short funnel was projected downward and began to move slowly at first, in a northeasterly direction, and an ominous roar could be heard for miles. The funnel gradually lengthened, and when about 4 miles from Kirksville the point seemed to be within 200 feet of the ground. Suddenly it dropped like a plummet and started its work of destruction. Just before it struck our house there was an awful roaring noise, and it was dark as a dungeon while the storm was passing over.

Others state that two clouds came together in the southwest; that on either side of the funnel there was an arc glowing like a halo around the moon; above the arcs there was intense blackness and below them lighter clouds; the funnel extending downward between these arcs alternately approached and receded from the earth, and when it approached the earth a dark mass rose to meet it. The arcs disappeared as the tornado drew near; the funnel-shaped cloud seemed to a distant observer to take a zigzag course, sweeping a path much wider than its own diameter. One house was carried high in the air, where it exploded with a loud report. There was a light fall of rain before the storm and a heavy fall a short time after its passage. Very little lightning was seen.

As in many other descriptions, so here, the light rains, the descending spouts, the dark clouds, the ascending whirl of debris, the heavier rain that occurs sometime later, all harmonize so closely with the phenomena of the waterspout at sea that there must be a very close analogy between these and the tornadoes in the interior of our continent.

#### MARIANO BÁRCENA.

All who are interested in the progress of meteorology will regret to learn of the death of Don Mariano Bárcena, the illustrious engineer, senator of the Mexican Republic, founder and director of the Central Meteorological Observatory, and member of many scientific societies. In his death, on the 10th of April, in the City of Mexico, meteorology loses one of its most active friends. As a student of engineering, he early showed a special interest in the natural sciences, particularly geology, on which subject he is a well-known author. He was appointed a director of the Central Meteorological Observatory on the 7th of March, 1877, the date of the foundation of the establishment. During his connection with this institution, he published many important works, among which may be especially mentioned his *Carpologia*.

#### NO INCREASE IN TORNADOES.

Although the Weather Bureau has for many years repeated the statement that our data do not justify us in believing that there has been any material change in the number of tornadoes, nor, indeed, in any other feature of the climate, during the present geological epoch, yet the belief in such changes still lingers, and we are much pleased whenever the daily press comes to the relief of the meteorologist in the attempt to disseminate more correct views as to the permanency of our climate.

We copy the following from the Iowa State Register and the Iowa Weather and Crop Service, as it undoubtedly gives the true explanation of a popular mistake:

Many think that the railroad tracks banding the nation, and the continually increasing and large aggregate of metal on the surface throughout the country, aid in creating electrical disturbances in the atmosphere, and they call attention to the manner in which the needle is affected by the pole to sustain their theory; but the contrary opinion is presented by others, who assert that the railroad tracks and telegraph lines are useful as lightning rods for the earth. The scientists have many theories in regard to this subject, but the fact remains that all countries had windstorms of all degrees before there was a railroad track or telegraph line on the face of the earth, and it is probable that the number has not been increased by the added years. All of the

civilized world's disasters are now published within twenty-four hours after occurrence, and that is the reason why there is an apparent large proportional increase in comparison with the days when telegraph and cable lines and daily newspapers were unknown—only one hundred years ago.

#### NO CHANGE IN THE CLIMATE OF APRIL.

The remarkable storms that we experienced during the spring of 1899, promptly started the query as to whether the climate has changed—that perennial theme about which the "oldest inhabitant" always freely expresses his ideas, though he knows little or nothing of it. It was soon shown that 2, 3, or 4 feet of snow had occurred in the Middle Atlantic States in a single storm several times during the past two hundred years; but, of course, each time over only a small district somewhere between Cape Hatteras and Cape Cod.

Now comes an interesting item with reference to Missouri, contributed by Prof. C. W. Prichett, of Glasgow, Mo., who says:

On April 7, 1837, it snowed all day in St. Charles and Warren counties, and on the morning of April 8 the snow was 2½ feet deep on the level. In April, 1857, the snow lay on the ground near Fayette from the 17th to the 20th to the depth of several inches. On April 15, 1842, the ground was so frozen in Warren County that we could not set stakes in the woods as guides for a worm fence.

#### RAINS OF SAND, DUST, AND MUD.

In the REVIEW for January, 1895, is given a full description of the general character of the dust that falls on our western plains, with snow or rain, and sometimes as perfectly dry dust; a recent occurrence of this kind is chronicled for April 30. At that time an area of low pressure moved from Colorado northeastward into Iowa. During the prevalence of the southerly winds on the southeast side of the storm center, the dust was carried in great quantities northward, but when the clouds coming from the west began to drop a little rain, preliminary to the heavy northwest winds that were to follow, then the dust became mud and the rain became a very dirty rain. This succession of dust followed by muddy rain moved eastward over the greater part of Nebraska, between 1 and 5 p. m., and during most of this time the sunlight was so obscured that lamps were lighted. The muddy rains occurred in Iowa as late as 9 p. m., but preceding that, viz, about 3:30 p. m., there were one or more tornadoes. A muddy rain began at Yankton, S. Dak., at 8 p. m. On the same day the severest northerly storm of the season occurred in Montana.

Both the dust storms and the tornadoes and northers indicate that there must have been ascending and descending currents of air of great violence, such as characterize what is called the unstable condition of the atmosphere in which air that has once started to ascend or descend, continues on its way with accelerated velocity. This condition of instability is sometimes spoken of as a condition in which colder air exists above and warmer air below, so that the colder air by virtue of its greater density, presses downward with sufficient force to displace the warmer air near the ground; but this is not a correct statement of the case, as the air is always colder overhead than it is below, and the mere deficit of temperature does not constitute instability. If the temperature diminishes with altitude at the rate of 1° F. in 185 feet, the atmosphere is said to be in neutral convective equilibrium, that is to say, if a cubic yard of this air is raised upward 1,000 feet, thereby cooling about 6° F., because of the internal work done by its own expansion, it will find itself surrounded by air of the same temperature, and will have no tendency to fall back or rise further. On the other hand, if the actual temperature of the air diminishes with altitude at